



Human Lunar Goals and Objectives

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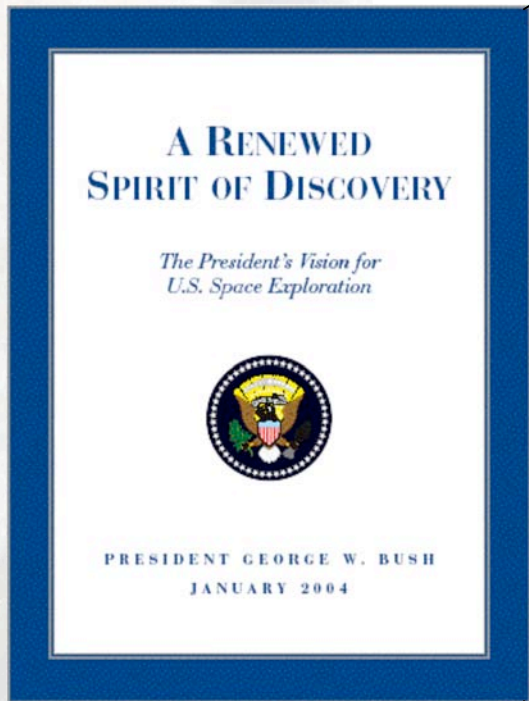
Exploration Systems Mission Directorate,
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The Vision for Space Exploration



The Fundamental Goal of This Vision is to Advance U.S. Scientific, Security, and Economic Interest Through a Robust Space Exploration Program

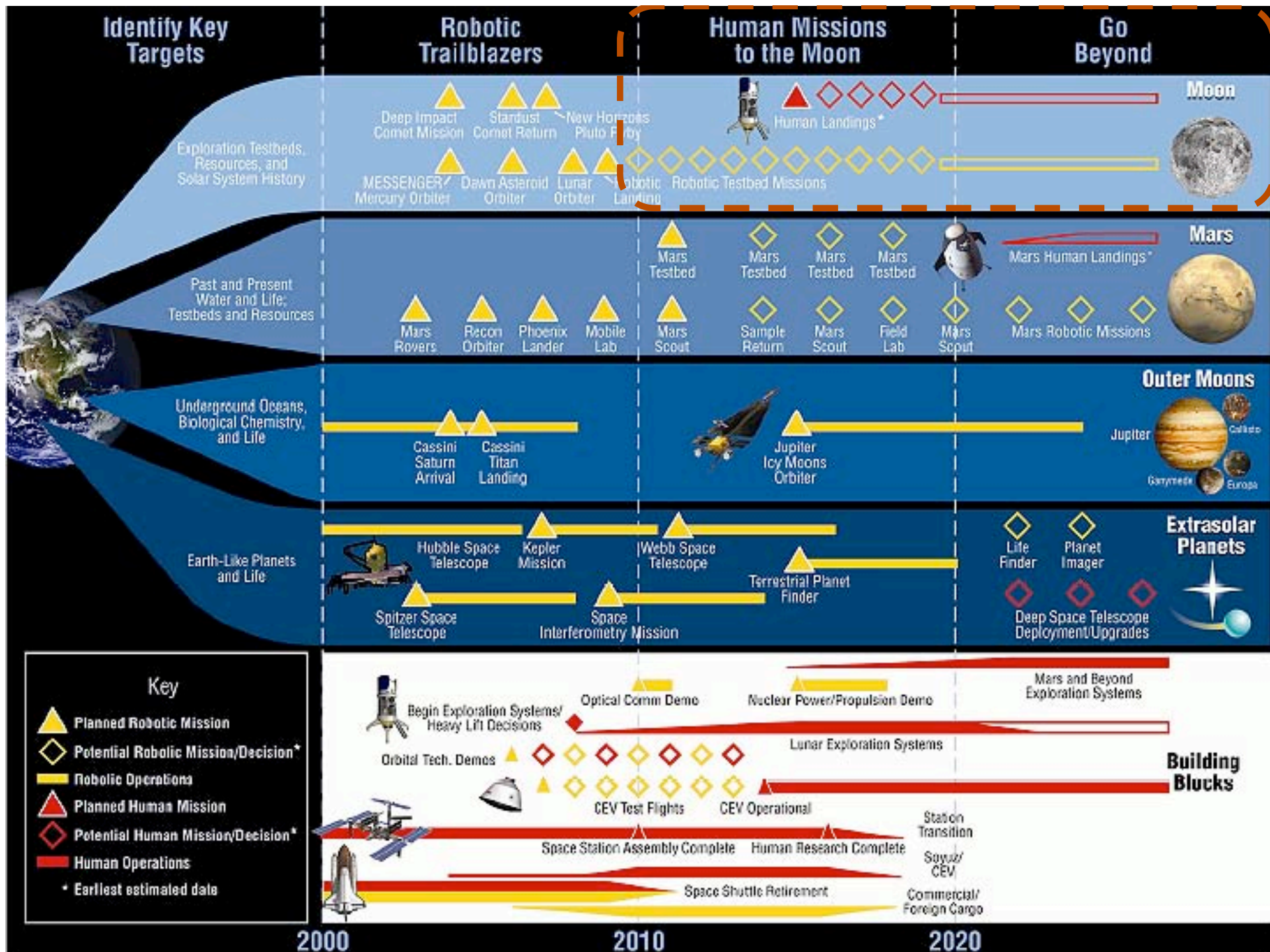


- ☐ Implement a sustained and affordable human and robotic program to explore the solar system and beyond
- ☐ Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;
- ☐ Develop the innovative technologies, knowledge, and infrastructures both to explore and to support decisions about the destinations for human exploration; and
- ☐ Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.

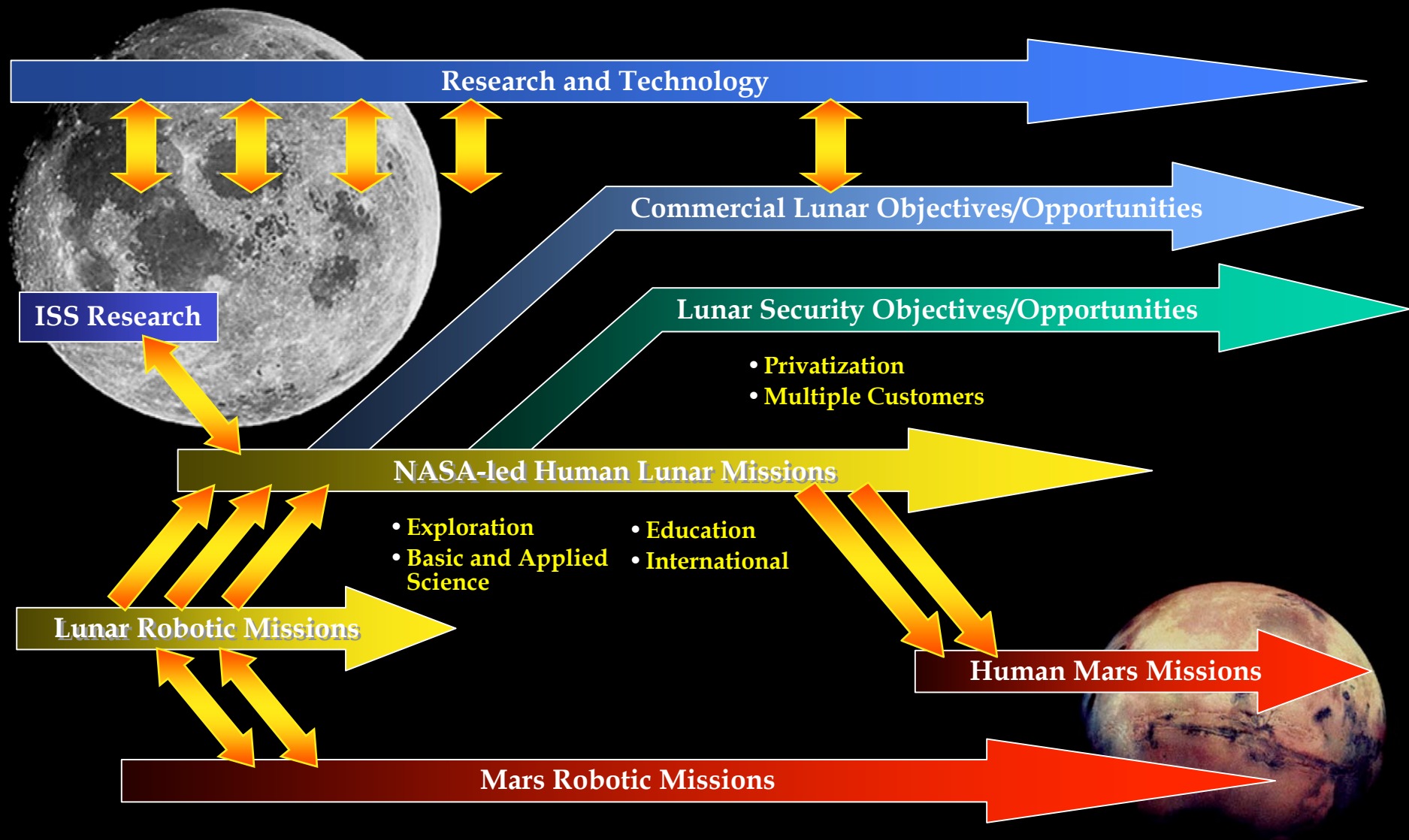


The Vision for Space Exploration

1. Return the Shuttle to safe flight as soon as practical, based on CAIB recommendations
2. Use Shuttle to complete ISS assembly
3. Retire the Shuttle after assembly complete (2010 target)
4. Focus ISS research to support exploration goals; understanding space environment and countermeasures
5. Meet foreign commitments
6. **Undertake lunar exploration to support sustained human and robotic exploration of Mars and beyond**
7. **Series of robotic missions to Moon by 2008 to prepare for human exploration**
8. **Expedition to lunar surface as early as 2015 but no later than 2020**
9. **Use lunar activities to further science, and test approaches (including lunar resources) for exploration to Mars & beyond**
10. Conduct robotic exploration of Mars to prepare for future expedition
11. Conduct robotic exploration across solar system to search for life, understand history of universe, search for resources
12. Conduct advanced telescope searches for habitable environments around other stars
13. **Demonstrate power, propulsion, life support capabilities for long duration, more distant human and robotic missions**
14. Conduct human expeditions to Mars after acquiring adequate knowledge and capability demonstrations
15. **Develop a new Crew Exploration Vehicle; flight test before end of decade; human exploration capability by 2014**
16. Separate cargo from crew as soon as practical to support ISS; acquire crew transport to ISS after Shuttle retirement
17. **Pursue international participation**
18. **Pursue commercial opportunity for transportation and other services**



Vision Leads to Strategy





Top Level Lunar Objectives and Definitions

Science:

- Provide opportunities for multi-disciplinary research and investigations, with an emphasis on discovery.

Preparation:

- Establish the capability to test and demonstrate technologies and operational techniques to further exploration goals at Mars.

Economic:

- Stimulate the U.S. economy with an emphasis on generating revenue and new business markets.

Security:

- Enhance U.S. Security by extending the strategic high-ground for global defense.

Crosscutting Dimensions and Benefits

- | | |
|-------------------------------|----------------------------------|
| • International Collaboration | • Inspiring the Nation |
| • Technology Spin-offs | • Inspiring Students of All Ages |

Second Tier Lunar Objectives



Science:

- Understand the Composition of the Moon
- Understand the Solar System
- Search for Life on Other Planets
- Astrobiology and Biological Science

Preparation:

- Long-Duration Human Physiology
- Demonstrate Operational Techniques
- Perform Technology Test and Verification
- Develop and Demonstrate Future Exploration Systems

Economic:

- Stimulate Commercial Transportation
- Develop and Utilize Space Resources
- Enhance the Commercial Tele-communication Market
- Generate Space Power
- Enable Entertainment / Advertisement / Tourism

Security:

- Stimulate the US Economy
- Enhance Strategic National Defense
- Stimulate U.S. Education (particularly in Science and Engineering)
- Improve U.S. Technological Competency
- Provide Global Protection from Natural Threats

Sources of Objectives and Definitions



- *“A Renewed Vision of Discovery”* (NPG-31)
- *“The Vision for Space Exploration”* (Feb-2004)
- Lunar Strategy Meeting (Nov-2004)
- Lunar Exploration Analysis Group (LEAG) Meeting (Jan-2005)
- Concept Exploration and Refinement (CE&R) Contractor Midterm Reports
- Exploration Systems Mission Directorate sponsored analyses

Strategy to Task to Technology (STT) Matrix-A

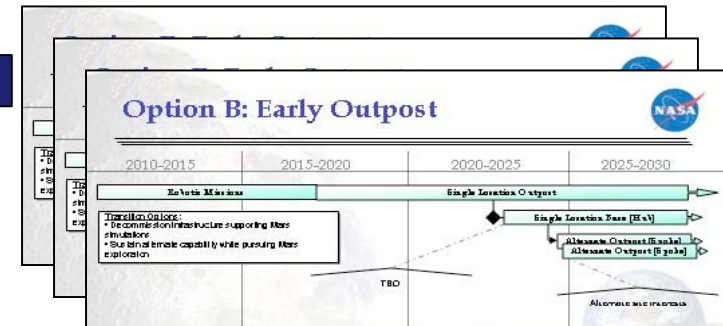
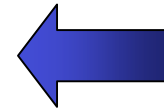


			Architectural Campaigns (Roadmap Alternatives)							
			Option-A: Evolution Emphasis	Option-B: Early Outpost	Option-C: Expedited Moon to Mars	Option-D: Commercial Emphasis	•	•	•	
Strategic Objectives	Science	Understand the Composition of the Moon								Scores
		Understand the Solar System								
		Search for Life on Other Planets								
		Astrobiology and Biological Science								
	Preparation	Long-Duration Human Physiology								
		Demonstrate Operational Techniques								
		Perform Technology Test and Verification								
		Develop and Demonstrate Future Exploration Systems								
	Security	Stimulate the US Economy								
		Enhance Strategic National Defense								
		Stimulate US Education (particularly in Science and Engineering)								
		Improve US Technological Competency								
		Provide Global Protection from Natural Threats								
	Economic	Stimulate Commercial Transportation								
		Develop and Utilize Space Resources								
		Enhance the Commercial Tele-communication Market								
		Generate Space Power								
		Enable Entertainment / Advertisement / Tourism								
			Scores							

Linkage Between STT and Lunar Objectives



		Architectural Campaigns (Roadmap Alternatives)											
		Option-A: Evolution Emphasis	Option-B: Early Outpost	Option-C: Expedited Moon to Mars	Option-D: Commercial Emphasis								
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Role of the Committee

This Meeting:

1. Review and baseline Objectives and Definitions
2. Review and comment on Strawman Roadmap Alternatives

Next Meeting:

1. Rank / weight the objectives
2. Baseline the Roadmap Alternatives

Mission Statement for Lunar Exploration



Establish a human presence on the Moon for the purpose of learning to live and work productively and permanently in a planetary environment.

